US Army Medical Research and Materiel

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Glanders/Meliodosis Vaccines

This is the first report of a Glanders/Meliodosis vaccine, whether subunit or live attenuated strain, which protects against an aerosol challenge with wild-type bacillus.

Burkholderia pseudomallei, the causative agent of meliodosis, inflicts high incidences of human pneumonia and deadly bacteremia in endemic areas including Southeast Asia and northern Australia. *B. mallei* is the etiologic agent of Glanders disease in horses and humans. In this application, *B. mallei* and *B. pseudomallei* quorum sensing alleles were identified and their genetic organization described. Merodiploids were constructed in each of the eight genes identified in the *B. mallei* and *B. pseudomallei* quorum alleles and the resulting strains were phenotypically characterized *in vivo*. *B. mallei* mutants were avirulent even though they produced a capsule, thus identifying a new virulence factor other than capsule. Additionally, there was a reduction in the ability of the mutants to colonize the spleen, liver and lungs of aerosolized BALB/c mice, indicating that quorum sensing plays a pivotal role in the pathogenicity of *B. mallei in vivo*. Exposure of animals to mutant *B. mallei* prior to challenge protected 40% of animals over a 21 day period while all unvaccinated animals perished within 3 days.

- **Features and advantages:**

- **Mutant *B. mallei* can provide immunity against Glanders or Meliodosis disease when adminis-tered prior to infection.**

- **Information about the genetic organization of quorum sensing genes and their sequence can be used to produce additional mutants with reduced virulence for diagnostic or prophylactic**

Patent Status

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- **One of the quorum sensing genes, lacking in *B. mallei* but present in *B. pseudomallei*, distinguish the two organisms.**

Point of Contact

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KEYWORDS: B. mallei; B. psuedomallei; quorum sensing; meliodosis; vaccine

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